REMARKS

By this response, claim 1 has been amended to include features of original claim 12. Claim 12 has been cancelled without prejudice or disclaimer. Upon entry of this Amendment, claims 1, 2, 4-11 and 13-20 remain pending. No new matter has been added. Reconsideration and allowance of the present application based on the following remarks are respectfully requested.

Entry of this Amendment is proper under 37 C.F.R. §1.116 as the amendments: (a) place the application in condition for allowance for the reasons discussed herein; (b) do not present any new issues that would require further consideration and/or search as the amendments merely amplify issues discussed throughout the prosecution; (c) do not present any additional claims without canceling a corresponding number of claims; and (d) place the application in better form for appeal, should an appeal be necessary. Entry of this Amendment is thus respectfully requested.

First, Applicant maintains all the previous arguments presented in the Response filed on October 13, 2007 ("Response") and hereby incorporates them in their entity into this Amendment. In brief, Applicant maintains that U.S. Patent No. 6,225,032 to Hasegawa *et al.* ("Hasegawa") and the Journal of Crystal growth 222 (2001) 452-458 by McGinnis *et al.* ("McGinnis") constitute non-analogous art to the presently claimed invention. Moreover, Applicant maintains that Hasegawa, McGinnis and U.S. Patent No. 6,252,648 to Hase *et al.* ("Hase"), or any proper combination thereof, do not teach or render obvious each and every feature of the claims and there is no legally proper teaching, suggestion, or reasoned basis to modify Hasegawa to include the teachings of McGinnis and Hase. Accordingly, Applicant submits that claim 1 as un-amended is patentable over the cited portions of the references as previously discussed in the Response.

Merely to expedite prosecution and in no way conceding to the previous rejections, claim 1 has been amended to recite aspects previously recited in now cancelled dependent claim 12. Since claim 12 has been searched and addressed in previously Office Actions, the amendment to claim 1 does not present any new issues which would require further search and/or consideration by the Examiner.

Claims 1-2, 4-6 and 8-20 stand rejected under 35 U.S.C. §103(a) as being unpatentable by Hasegawa in view of McGinnis and in further view of Hase. Applicant respectfully traverses this rejection.

Assuming that Hasegawa and McGinnis are deemed analogous art (which Applicant does not concede), the cited portions of Hasegawa, McGinnis, Hase and any proper combination thereof fail to disclose, teach or render obvious a lithographic projection apparatus comprising, *inter alia*, a radiation system configured to provide a beam of radiation; a support configured to support a patterning device, the patterning device configured to pattern the beam according to a desired pattern; a substrate table configured to hold a substrate; and a projection system configured to project the patterned beam onto a target portion of the substrate, wherein a space in the radiation system and/or projection system comprises a composition to remove a contaminant from a surface of the apparatus, the composition containing (a) and (b), wherein (a) is one or more perhalogenated C_1-C_6 alkanes and (b) is one or more compounds including one or more nitrogen atoms and one or more atoms selected from hydrogen, oxygen and halogen, as recited in claim 1.

Moreover, the cited portions of Hasegawa, McGinnis, Hase and any proper combination thereof fail to disclose, teach or render obvious a device manufacturing method comprising, *inter alia*, providing a beam of radiation using a radiation system; patterning the beam; projecting the patterned beam of radiation onto a target portion of a layer of radiation-sensitive material at least partially covering a substrate; and producing reactive species of a composition to remove a contaminant from a surface, wherein a space through which the beam passes comprises the composition containing (a) and (b), wherein (a) is one or more perhalogenated C_1-C_6 alkanes and (b) is one or more compounds including one or more nitrogen atoms and one or more atoms selected from hydrogen, oxygen and halogen, as recited in claim 19.

Hasegawa discloses a method and apparatus for manufacturing liquid jet heads and for providing a water-repellent layer on the resin surface on a liquid jet head. In the method, a laser beam L is generated by a laser oscillator 10 and projected through a projection optical system 15. The laser beam L emerging from the projection optical system 15 is directed through a discharge port 23 of the liquid jet head and onto a resin 27 or absorbent 28 containing a solution. Through the interaction of the laser beam L and the compounds in the resin 27 or absorbent 28, a water-repellent layer is formed on the liquid jet heads. *See*, Figures 2, 5 and 6 and column 2, lines 12-30 of Hasegawa.

In other words, the laser beam passes through the discharge port 23 of the liquid jet head and irradiates the compounds in the resin 27 or absorbent 28 which then form a water-repellent layer onto the opposite side of the liquid jet head from which the laser beam was

originally incident. In contrast, claim 1 recites the aspects of "**a space in the radiation system and/or projection system comprises a composition** to remove a contaminant from a surface of the apparatus, the composition containing (a) and (b), wherein (a) is one or more perhalogenated C_1-C_6 alkanes and (b) is one or more compounds including one or more nitrogen atoms and one or more atoms selected from hydrogen, oxygen and halogen." The resin 27 or absorbent 28 of Hasegawa are not in a space of the radiation system and/or projection system, but are located on the opposite side of the liquid jet head from where the laser beam L is incident and no where near the laser oscillator 10 or the projection optical system 15.

Moreover, the cited portions of Hasegawa fail to disclose, teach or render obvious at least the aspect of "projecting the patterned beam of radiation onto a target portion of a layer of radiation-sensitive material at least partially covering a substrate," as recited in claim 19. As discussed above, the laser beam L of Hasegawa passes through the discharge port 23 or opening of the liquid jet head in order to irradiate compounds on either the resin 27 or absorbent 28. The result of this irradiation of these compound produces a water-repellant layer on the opposite side of the laser jet head from which the laser beam L was incident. Thus, the cited portions of Hasegawa fail to disclose or teach a radiation-sensitive material of the liquid jet head. Since, the cited portions of Hasegawa fail to disclose or teach the radiation-sensitive material, it cannot disclose or teach the aspect of projecting the pattern bean onto a radiation-sensitive material.

Furthermore, the cited portions of Hasegawa fail to disclose, teach or render obvious at least the aspect of "a space through which the beam passes comprises the composition," as recited in claim 19. As discussed above, the laser beam L of Hasegawa passes through the discharge port 23 of the liquid jet head and then onto the resin 27 or absorbent 28. Thus, the resin 27 or absorbent 28 is not in a space through which laser beam L passes, but is the target on which the laser beam L is incidient.

Further, the cited portions of Hasegawa fail to disclose, teach or render obvious at least the aspect of "producing reactive species of a composition to remove a contaminant from a surface," as recited in claim 19 and similarly recited in claim 1.

In particular, Hasegawa states that:

> Now, however, when drilling is made by a technique of the kind for the formation of discharge ports, the byproducts that are created at the time of laser processing and allowed to adhere to the processing surface of the ceiling plate. Then, the surface energy per hour becomes higher on the portions where

> the byproducts have adhered, and the resultant wettability becomes higher with respect to the recording liquid. In other words, such surface becomes hydrophilic.
>
> In order to enhance the discharge efficiency of the recording liquid at its discharge ports of a liquid jet head, it is desirable to make them water-repellent in order to avoid any stronger interaction between liquid and resin.

Hasegawa, col. 2, lines 40-51. To make the byproducts water-repellent, Hasegawa discloses exposing the byproducts to a fluorine atmosphere to make the byproducts water repellent. In this regard, Hasegawa discloses:

> It is then attempted to fluorinate the surface of the byproducts. In this way, the chemical modification is performed on the surface of the byproducts that causes the surface energy to rise when adhering to the blank. The surface of the byproducts are thus fluorinated so as to suppress the phenomenon that may bring about the local hydrophilicity on the surface of the discharge port plate due to the adhesion of the byproducts. At the same time, this method enables the water-repellency of the related surface to be enhanced more than the conventional art.

Hasegawa, col. 7, lines 57-65. Thus, the cited portions of Hasegawa do not teach or render obvious a composition to remove a contaminant (e.g., the byproducts - "there is no need for the provision of any special processes in order to remove the byproducts" Hasegawa, col. 14, lines 40-41) but rather merely teaches applying a fluorine atmosphere to make the byproducts water-repellent. Indeed, the process of Hasegawa adds material, and does not remove a contaminant. Moreover, the cited portions of Hasegawa fail to provide any teaching or suggestion regarding a composition including one or more nitrogen atoms.

Further, the cited portions of McGinnis and Hase fail to overcome the deficiencies of Hasegawa. The cited portions of McGinnis fail to provide any teaching regarding a lithographic apparatus. Moreover, the cited portions of McGinnis and Hase fail to provide any teaching regarding a composition to remove a contaminant from a surface of a lithographic apparatus, the composition containing one or more perhalogenated C_1-C_6 alkanes. Rather, the cited portions of McGinnis merely provide disclosure of ammonia cleaning and annealing for metalorganic chemical vapor deposition-grown GaN on 6H-SiC substrates. Moreover, the cited portions of Hase merely disclose providing an inert gas containing a small amount of oxygen which results in the production of ozone for removing an organic compound deposited on an optical element.

Even assuming arguendo that Hasegawa and McGinnis are deemed analogous art, there is no proper teaching, suggestion, or reasoned basis to modify Hasegawa to include the

teachings of McGinnis and Hase. The Final Action alleges that McGinnis, on pages 452-453, discloses that an ammonia flux is introduced into a plasma atmosphere. [Final Action, page 3]. The Final Action then alleges that it would have been obvious to modify Hasegawa by introducing the plasma atmosphere with ammonia because McGinnis discloses that the ammonia flux introduced into the plasma beam resulted in the inhibition of surface roughening and produced a relatively smooth substrate surface. [Final Action, page 4].

As discussed above, McGinnis describes metalorganic chemical vapor deposition-grown GaN on 6H-SiC substrates, which is cleaned by annealing the substrate in an ammonia flux. It is not clear that McGinnis discloses introducing an ammonia flux into a plasma atmosphere. Pages 452-453 of McGinnis appear only to discuss plasma in the context of prior studies by others, not in terms of their work. Indeed, McGinnis teaches away from plasma by stating that "prolonged nitrogen plasma exposure...causes surface damage" McGinnis, pg. 452.

Moreover, there is no reasoned basis, teaching or suggestion that McGinnis' ammonia flux would have a similar effect on the liquid jet recording heads of Hasegawa. Indeed, Hasegawa is not at all concerned with cleaning a contaminant, unlike McGinnis. Further, the environments of McGinnis and Hasegawa are completely dissimilar – McGinnis relating to metalorganic chemical vapor deposition while Hasegawa relating to a method and apparatus for manufacturing liquid jet heads wherein a resin ceiling plate of the head is grooved, drilled, or the like by the irradiation of a laser beam. Indeed, McGinnis and Hasegawa have little if anything in common with each other and a person skilled in the art certainly wouldn't look to either of these references to modify the other. The Final Action has provided no reasoned basis to explain why a person skilled in the art would look to McGinnis to modify Hasegawa.

Furthermore, the Final Action alleges that Hase, at column 3, lines 32-54, column 4, lines 38-60 and column 5, lines 33-35, discloses that the composition in the exposure apparatus can be utilized to clean the surfaces of the exposure apparatus. Moreover, the Final Action alleges that Hase, at column 4, lines 1-60, discloses that the oxygen and nitrogen is mixed in the projection system and is impinged with a laser light treatment that inherently produces oxides including oxides of nitrogen, such as nitrogen dioxide. [Final Action, page 4]. The Final Action then alleges that it would have been obvious to modify Hasegawa and McGinnis by purging the nitrogen and oxygen via the illumination system because Hase discloses that introducing nitrogen with small controlled amounts of oxygen enables the

formation of ozone which in turn oxidizes any organic compounds deposited on the optical elements. [Final Action, page 4].

As discussed above, the cited portions of Hase merely describe providing an inert gas containing a small amount of oxygen which results in the production of ozone for removing an organic compound deposited on an optical element. There is no reasoned basis, teaching or suggestion that Hase's inert gas would have a similar effect on the liquid jet recording heads of Hasegawa. Again, Hasegawa is not at all concerned with cleaning a contaminant, unlike Hase. Further, the environments of McGinnis and Hasegawa are completely dissimilar – Hase relating to cleaning optical elements (i.e., lenses, mirrors or windows) while Hasegawa relating to a method and apparatus for manufacturing liquid jet heads wherein a resin ceiling plate of the head is grooved, drilled, or the like by the irradiation of a laser beam. Indeed, Hase and Hasegawa have little if anything in common with each other and a person skilled in the art certainly wouldn't look to either of these references to modify the other, and the Final Action has provided no reasoned basis to explain why a person skilled in the art would look to Hase to modify Hasegawa.

For at least the reasons set forth above, a *prima facie* case of obviousness under 35 U.S.C. §103 for claims 1 and 19 has not been established. Claims 2, 4-6, 8-11 and 13-18 are patentable at least by virtue of their dependency from claim 1, and for the additional features recited therein. Claim 20 depends from claim 19 and is allowable by virtue of its dependency from claim 19, and for the additional features recited therein. Accordingly, Applicant respectfully requests that the rejection of claims 1-2, 4-6, 8-11 and 13-20 be withdrawn.

Claim 7 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Hasegawa in view of McGinnis and further in view of U.S. Patent No. 5,320,707 to Kanekiyo *et al.* ("Kanekiyo"). Since claim 7 is dependent from claim 1 and claim 1 stands rejected by the combination of Hasegawa, McGinnis and Hase, Applicant will assume that claim 7 stands rejected by the combination of Hasegawa, McGinnis, Hase and Kanekiyo. Applicant again respectfully requests that this issued be clarified and, additionally, traverses this rejection.

Claim 7 depends from and claims additional features of claim 1. Since the cited portions of Hasegawa, McGinnis and Hase, individually or in any combination, do not teach or render obvious claim 1 and the cited portions of Kanekiyo do not remedy the defects of Hasegawa, McGinnis and Hase with respect to claim 1, dependent claim 7 is allowable by virtue of its dependence from an allowable base claim, and for the additional features it recites.

The cited portions of Kanekiyo merely teach a method of dry-etching a sample, such as a semiconductor wafer, having an aluminum film structure to be etched in a plasma under reduced pressure. *See*, Abstract of Kanekiyo. For example, the cited portions of Kanekiyo fail to disclose, teach or render obvious a lithographic projection apparatus comprising, *inter alia*, a radiation system configured to provide a beam of radiation; a support configured to support a patterning device, the patterning device configured to pattern the beam according to a desired pattern; a substrate table configured to hold a substrate; and a projection system configured to project the patterned beam onto a target portion of the substrate, wherein a space in the radiation system and/or projection system comprises a composition to remove a contaminant from a surface of the apparatus, the composition containing (a) and (b), wherein (a) is one or more perhalogenated C_1-C_6 alkanes and (b) is one or more compounds including one or more nitrogen atoms and one or more atoms selected from hydrogen, oxygen and halogen, as recited in claim 1.

All rejections having been addressed, it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited. If any point remains in issue which the Examiner feels may be best resolved through a personal or telephone interview, please contact the undersigned at the telephone number listed below.

Please charge any fees associated with the submission of this paper to Deposit Account Number 033975. The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted,

PILLSBURY WINTHROP SHAW PITTMAN LLP

EMILY T. BELL
Reg. No. 47,418
Tel. No. 703.770.7661
Fax No. 703.770.7901

Date: February 22, 2008
P.O. Box 10500
McLean, VA 22102
703.770.7900